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misfortunes, nor is mentioned the biography by E. F. Letvenov (St. Petersburg, 1894, p. 79) containing romantic pictures of these eternal interests.

Austin, Texas.

DEPARTMENTS.

SOLUTIONS OF PROBLEMS.

ARITHMETIC.

110. Proposed by F. P. MATZ, M. Sc., Ph. D., Professor of Mathematics and Astronomy, Irving College, Mechanicsburg, Pa.

By measuring with a yard $m=12\frac{1}{2}\%$ *too short*, my profits are $n=25\%$ of my sales. If my yard be $p=10\%$ *too long*, what per cent. of my sales will be my profits?

I. Solution by J. K. ELLWOOD, A. M., Principal of Colfax School, Pittsburg, Pa., and B. F. SINE, Principal of Capon Bridge Normal School, Capon Bridge, W. Va.

$(1-m)$ yards cost $\frac{3}{4}$ of sale price.

$$(1+p)\text{ yards cost }(1+p)\times\frac{1}{1-m}\times\frac{3}{4}=\frac{3(1+p)}{4(1-m)}.$$

$$1-\frac{3(1+p)}{4(1-m)}=1-\frac{3\times1.10}{4\times.87\frac{1}{2}}=\frac{2}{35}\text{ of sales, the profit.}$$

II. Solution by JOHN F. TRAVIS, Student in Ohio State University, Columbus, Ohio.

1. 100%=the sales. Then
2. 75%=cost price of the part sold in terms of the selling price.
3. 1. 100%=correct length of a yard.
   2. $87\frac{1}{2}\%$=length used.
   3. $87\frac{1}{2}\%=75\%$ the cost of this part in terms of its selling price.
   4. $1\%=\frac{1}{87\frac{1}{2}}$ of $75\%=\frac{75}{87\frac{1}{2}}\%$, and
   5. $100\%=100$ times $\frac{75}{87\frac{1}{2}}\%=85\frac{5}{7}\%$.

$\therefore$ The cost of the part sold in terms of its selling price, is $85\frac{5}{7}\%$.

4. 1. $100\%=85\frac{5}{7}\%$.
   2. $1\%=\frac{1}{100}$ of $85\frac{5}{7}\%=.85\frac{5}{7}\%$, and
   3. $10\%=10$ times $.85\frac{5}{7}\%=8.5\frac{5}{7}\%$.
5. $85\frac{5}{7}\%+8.5\frac{5}{7}\%=94.2\frac{6}{7}\%$, cost of a yard in terms of its selling price, when the measure is 10% too long.
6. $100\%-94.2\frac{6}{7}\%=5\frac{5}{7}\%$ gain.

$\therefore$ In the latter case my gain will be $5\frac{5}{7}\%$ of the selling price.

Also solved by *COOPER D. SCHMITT, ALOIS F. KOVARIK*, and *P., H. PHILBRICK.*